FAA's RESPONSE and CURRENT SUPPORTING ACTIVITIES

SSAC Recommendations	FAA Response	Supporting Activities

1. The FAA should determine the cause for the inconsistencies noted throughout the report, and determine what actions, if any, are required in addition to those recommended in this report.	Over the past 3 years the FAA has been proactive in gathering information and addressing inconsistency issues. The results of this activity have been the Aircraft Certification Service (AIR) Software Grand Design and the Office of Information Services (AIO) Process Engineering Group. These activities have resulted in the development of policy, training, and other initiatives.
	
	In addition the FAA, in conjunction with the Streamlining Software Aspects of Certification (SSAC) Technical Team, is conducting a survey of the FAA personnel to identify any additional inconsistency issues.
	
	The following are other key organizations that will participate in the implementation plan:
	Airway Facilities (AF)
	   Operational Support (AOS)
	   NAS Operations (AOP)
	Communications, Navigation, and Surveillance Systems (AND)
		• **Software Grand Design** (On-going)
		• **FAA-iCMM (integrated Capability Maturity Model)**
		• **SSAC Workshops** (On-going)
		• **RTCA Software Committees** (On-going)
		• **CAST (Certification Authority Software Team)** (On-going)
		• **Software Web-Site** (On-going)
		• **Software Policy/Guidance Activities**
		  • Software tool qualification guidelines (Completed)
		  • Software review process guidelines (Completed)
		  • User-modifiable software approval guidelines (Completed)
		  • Field-loadable software approval guidelines (Completed)
		  • Guidelines for Parts Manufacturer Approval of field-loadable software (Completed)
		  • Guidelines for software changes in legacy systems (Completed)
		  • Previously developed software approval guidelines (Completed)
		  • Change impact analysis guidelines (Pending)
		  • Software re-use guidelines (Pending)
		  • Software conformity guidelines (Pending)
		  • Guidelines for determining Level of FAA Involvement (LOFI) in software projects (Pending)
		  • Software roles & responsibilities (Pending)
		  • CNS/ATM Software Guidelines (Pending)
		• **Software Training Activities**
		  • AIR Software briefing to managers (Completed)
		  • Computer science interactive video teletraining (IVT) and video (Completed)
		  • AIR's "Using the Software Job-aid to Conduct Software Reviews" IVT and video (Completed)
		  • AIR's "New Software Policy" IVT and video (Completed)
		  • AIR's software fundamentals course (On-going)
		  • Software procedures course (Pending)
		  • Software standardization conference (On-going)
		  • AIO's DO-178B fundamentals course (On-going)
		  • AIO's DO-178B Managers' Briefing (On-going)

2. The FAA should hire a sufficient number of software engineering experts to understand the safety impact of software technologies for all aviation systems (e.g. airborne, ground-based, and satellite systems).	The FAA recognizes the importance of hiring and keeping software experts. AIR has started addressing this issue in the Software Grand Design Staffing Needs Report. The RTCA Task Force Select Committee Plan will further address the resource needs. Additionally, these resource needs will be addressed in the context of the FAA's total resource issues and constraints.	• **Staffing Needs Report** (Pending) • **Joint Implementation Plan** (Pending) • **RTCA Task Force Select Committee Plan** (Pending)
3. The FAA should establish processes for regularly assessing software policy and guidance needs; developing new software policy and guidance when needed; and assessing and enhancing the clarity, consistency, and completeness of software policy and guidance.	The FAA is committed to continuous interaction with industry and other government agencies in order to improve upon our current policy and guidance. AIO's software process improvement activities, AIR's continuous improvement effort, and industry forums are examples of how FAA is addressing this issue.	• **Software Web-Site** (On-going) • **AIO Process Improvement Program** (On-going) • **AIR Continuous Improvement Program** (On-going) • **RTCA/EUROCAE Software Committees** (On-going) • **SSAC Breakout sessions** (On-going) • **Continuous interaction with industry** (On-going) • **Feedback sessions at Software Standardization Conferences** (On-going)
4. The FAA should initiate a program of proactive research to evaluate the potential impact of software technology on cost and safety. The research output should influence the development of policy, guidance, regulations, and training for software engineering.	A number of research efforts are under way to address software technology in aviation. AIR's Flight Critical Digital Systems Research program, FAA's Software Engineering Research Center, and the NASA Aviation Safety Program. Additionally, the FAA hopes to utilize resources by cooperative research with industry, universities, and other government agencies.	• **AIR Research Plan for Software** (On-going) • **NASA's Aviation Safety Program** (On-going) • **Software Engineering Research Center** (On-going) • **Cooperative Research Programs with industry, universities, and other government agencies** (On-going)

5. The FAA should develop unified policy and guidance for approving software aspects of all aviation systems (e.g. airborne, ground-based, and satellite systems).	AIR and AIO are working together to implement the applicable software policy into both the air and ground-based guidelines. This will be more fully addressed in the RTCA Task Force Select Committee Plan.	• **RTCA Task Force Select Committee Plan** (Pending)
		• **RTCA Committees (SC-189/SC-190)** (On-going)
		• **Certification Authorities Group (CAG) & Certification Authorities Software Team (CAST)** (On-going)
		• **Policy and Guidance**
		  • Change impact analysis guidelines (Completed)
		  • Software tool qualification guidelines (Completed)
		  • Software review process guidelines (Completed)
		  • User-modifiable software approval guidelines (Completed)
		  • Field-loadable software approval guidelines (Completed)
		  • Guidelines for software changes in legacy systems (Completed)
		  • Previously developed software approval guidelines (Completed)
		  • Software re-use guidelines (Pending)
		  • Guidelines for determining Level of FAA Involvement (LOFI) in software projects (Pending)
		  • Software roles & responsibilities (Pending)
		  • CNS/ATM Software Guidelines (Pending)
		• **Joint Software Training Activites**
		  • DO-178B managers briefing (On-going)
		  • DO-178B fundamentals course (On-going)
		  • Software procedures course (Pending)

6. The FAA should institute a regulatory authority independent of acquisition authority for approval of ground-based systems	RTCA Task Force Select Committee is addressing this issue, since it was also a recommendation of the Task Force. FAA software personnel will serve as liaison between SSAC and Certification Select Committee.	• **RTCA Task Force Select Committee** (Pending)

| 7. The FAA should improve software expertise within the agency by: Identify the minimum software staffing needed to ensure a consistent approach and timely response for software approvals for all applicants; Continually assessing software personnel needs and hiring to meet the needs; Create, fund, and fill software engineering positions throughout the FAA. As a minimum, fund and fill software positions to assist the field offices and software engineering experts; Require software engineers who appoint and advise software designees meet the same qualifications as designees. | AIR has assessed software needs and has developed a Software Staffing Needs Report to address staffing of Aircraft Certification Offices (ACO) and Manufacturing Inspection District Offices (MIDO). Training has been developed to address technical needs of the AIR workforce and designees. AIO is in the process of establishing a similar assessment and staffing plan for the ground-based community. | **Policy and Guidance Activities** (On-going) **Development of Knowledge, Skills, and Abilities (KSAs) needed for software approval** (On-going) **Training Activities** (On-going) **Needs Assessment to determine FAA's training needs** (On-going) **Software Staffing Needs Report** (Pending) **Software Designee Management Report** (Completed) **AIO's Software Competency Assessment Activities** (On-going) |

| **8.** The FAA should establish a means to ensure that the software approval process allows applicants to use appropriate new software technologies in a timely manner. | RTCA/EUROCAE software committees are currently meeting this need. In addition, the FAA has proposed and discussed with industry the potential of a "High Tech Forum" in conjunction with RTCA/EUROCAE to address new software issues in a more timely manner. Additionally, FAA is striving to coordinate all new software policy and guidance with the industry to meet the technology changes. This will be further addressed by the RTCA Task Force Select Committee. | • **RTCA Task Force Select Committee Plan** (Pending)
• **RTCA/EUROCAE Committees** (On-going)
• **Software Policy/Guidance Activities (with industry's input)**
  • Software tool qualification guidelines (Completed)
  • Software review process guidelines (Completed)
  • User-modifiable software approval guidelines (Completed)
  • Field-loadable software approval guidelines (Completed)
  • Guidelines for Parts Manufacturer Approval of field-loadable software (Completed)
  • Guidelines for software changes in legacy systems (Completed)
  • Previously developed software approval guidelines (Completed)
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  • Software procedures course (Pending)
  • Software standardization conference (On-going)
  • AIO's DO-178B fundamentals course (On-going)
  • AIO's DO-178B Managers' Briefing (On-going)
• **Software Web-Site** (On-going) |

9. The FAA should require companies providing software for all aviation systems (e.g. airborne, ground-based, and satellite systems) to demonstrate competence in DO-178B. The FAA should use DO-178B competence demonstrated by the applicant as a factor in establishing the level of involvement in software assessment activities.	AIR has created criteria to address a company's certification history, software experience, designee support, etc. to determine Level of FAA Involvement (LOFI) in the software project. As an expansion of the LOFI, the FAA and industry have begun discussions on the development of a DO-178B assessment strategy. This will provide the FAA a measure for level of FAA involvement in software projects. It will also provide industry a tool to determine areas of improvement in their software project team. Additionally, AIO will use the assessment to assess risks in ground-based contracts.	• **Level of FAA Involvement Criteria** (Pending) • **Designee Management Report** (Completed) • **Best Practices Paper** (Completed) • **Software Procedures Training for FAA and Industry** (Pending) • **Software Standardization Conferences (for FAA and industry)** (On-going) • **FAA-iCMM (Integrated Capability Maturity Model) to DO-178B mapping** (Completed) • **Software videos** (Completed) • **SSAC workshops** (On-going) • **RTCA/EUROCAE SC-190/WG-52** (On-going) • **Software web-site** (On-going) • **DO-178B assessment process** (Pending)
10. FAA should make training on DO-178B available to designees.	AIR has launched an annual Software Standardization Conference which is available to designees. Software training videos and web-site materials are also available to designees. AIR also plans to make the Software Procedures Course available to designees when it becomes available. AIO makes all DO-178B training available to FAA contractors. AIO and AIR are working together for future Software Standardization Conferences and on the Software Procedures Course, in order to standardize air and ground efforts.	• **Software standardization conferences** (On-going) • **Software procedures course** (Pending) • **Software videos** (Completed) • **Software web-site** (On-going)